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No. III.

COPYING SCREWS BY THE LATHE.

The ***Thanks*** *of the Society were this session voted to Mr.* ***Cornelius Varley****, for communicating to the Society the method adopted by his late uncle, Mr. Samuel Varley, of copying Screws by means of the Lathe.*

52, Upper Thornhaugh-street, Tottenham-court-road, Feb, 16, 1825.

Dear Sir,

I beg leave to lay before the Society drawings of the methods which my late uncle, Mr. Samuel Varley, adopted for copying or cutting set screws for ordinary work in the lathe.

I am, Sir,
&c. &c. &c.
Cornelius Varley.

A. Aikin, Esq.
Secretary, &c. &c.

Plate V. fig. 1, is a bird's-eye view of a lathe, showing the method of cutting an external thread, by using one of the original true screws *a*, which are cut on one cylinder, and fitted on the maundrel. A piece *b* is made to slide on the connecting bar *c*, for the purpose of adjusting the guide pin *d* to suit the required thread. The screw *e* secures it when adjusted; another sliding bar *ff* moves at right angles to the bar *c*, having an end screw *g* to fasten it; this carries the screw tool *h*, which of course must correspond with the guide in use; the screw tool is secured to the bar *f* by the clamp plate *i i;* the tool is tightened by the screw *j*, and an additional pinch is given by the screw *k*. *l l* is a rest, which supports the tool while cutting; *m m* a stage or support for the other end of the bar or sliding piece *b*; it has a metal ridge *o o*, in order to support the guide pin *d*: to secure the concentric truth of the screw, there is an adjusting screw *g* underneath the screw-tool *h*, shown in front elevation, fig. 2. The point of this screw bears against the rest, and thus determines the depth of the thread, or diameter of the screw; it also determines the parallelism or taperness of the screw, according as the rest *l* is set parallel or inclined to the axis of the screw. Thus a very complete command of the screw in all its dimensions is obtained.

To use the tool, the left hand holds the end piece *b*, and keeps the guide pin pressed close into the thread of the guide *a*, while the right hand holds the bar *f* as a handle to the turning tool *b*, and secures the cut: in using this tool the lathe is kept always turning in the same direction, and when the cutter *h* touches the shoulder of the screw, both it and the guide-pin *d* are suddenly drawn out of contact by a parallel motion of both hands, and brought forward to begin again at the point of the screw, and this motion is repeated till the screw is finished. There is no occasion to look at the guide point *d*, as the left hand feels when it is in contact.

Fig. 3 shows a screw-tool fixed on the bar *f*, for cutting an internal screw. A piece *r* is screwed on the rest at right angles to it, for the adjusting screw *q* to act against, it being put the reverse way in the hole, by which the concentric truth and diameter, &c. of the screw are determined as before. In ordinary work there is but little occasion to use this adjusting screw.

Fig. 4, a front elevation of the preceding.

Fig. 5, the bar *f*; the clamp plate *i* being removed to show the two grooves *s* and *t*, which hold the external and internal screw-tools.

Fig. 6, an end view of the sliding piece *b*.

Figs. 7, 8, 9, 10, 11, show the three parts separate of which the sliding piece is composed, besides the two plates *b b*, which are shown in the end view, fig. 6. These plates are rivetted together with the pieces 7 and 10 between, which leaves a space for the bar *c* to slide through. Fig. 9 is a slip for the point of the screw *e* to act against.

Now, although it is frequently requisite in practice to have such a long projecting guide-pin, and for the screw-tool to project so far from the bar *c*, in order to clear large chucks or flanches, yet it is desirable to bring them as near as possible to the bar *c*, when very accurate work is wanted. This is effected in the manner shown in figs. 12, 13, 14.

Figs. 12, 13, the brass end which holds the guide-pin *d*; this pin may be twisted round in the hole to adjust its knife edge to suit the inclination of the threads of the different guides which it has to enter; *u* a pin or finger-piece, by which it is held; *w* the clamp-plate, capable of sliding under the heads of the screws when they are loosened; *x x* different holes along the bar *c*, to receive the clamp screws, by which the cutter may be adjusted to any required distance from the guide-pin *d*.

Fig. 14, an edge view of the clamp-plate *w*, showing the adjusting screw under it.

Figs. 15, 16, show the method of guarding the point of the cutter when making long screws on small cylinders. A small cylinder is very liable to spring away from the tool, which continues following it. It then rises over upon the tool and breaks off its point, while the cylinder is frequently bent, and thereby spoiled. This is effectually prevented by using the shield or guide-plate *y*. I prefer making it of brass, as it soon receives an impression of the thread, and becomes a guide; it prevents the point from entering deeper than it is set for, as the box of a plane does with regard to its iron, and totally prevents all change in the angle of the tool to the work. This point may be used either for deepening the thread of a common screw, in order to make new dies, or for cutting a screw from the screw guides, in which case it is screwed on to the bar *c* with its shield, instead of the screw tool and clamp-plate *w*, fig. 12.

Fig. 17, an edge view of part of the bar *c*.